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SECRET

PROGRESS REPORT NO. 13

L-BAND

TRAVELING-WAVE TUBES

Index No NE-111613, Subtask 15

Contract Number-57413

June 1953

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CASE: 8-18-78
VACUUM TUBE LABORATORY

FEDERAL TELECOMMUNICATION LABORATORIES, INC.

500 WASHINGTON AVENUE

MUTLEY 10, NEW JERSEY

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COPY NO. 4
July, 1953

**NAVY DEPARTMENT, BUREAU OF SHIPS
WASHINGTON, 25, D. C.**

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PROGRESS REPORT NO. 13

L-BAND TRAVELING-WAVE TUBES

The third developmental model of the Type X-244 L-band traveling-wave tube was constructed during the month of June, 1953. This tube used the severed helix for circuit isolation and in this respect was similar to the two previous tubes. Approximately 9 db of additional center loss was added in the form of aquadag coating which was sprayed on the quartz helix-supporting rods.

Upon completion, the tube was connected to the exhaust system and the pumps were started. When the system pressure had reached a satisfactory low value, the baking schedule was started and the oven temperature was raised as fast as gas evolution would permit.

Because of a faulty thermocouple, the oven temperature reached a value close to that of the melting point of the glass in the stem. During the night, the line voltage rise was sufficient to cause the oven temperature to exceed the safe limit and the glass softened and was sucked inward. Considerable time elapsed before the difficulty was discovered and the power was turned off. The tube was badly oxidized.

Effort has been since concentrated on rebuilding the tube. Where required, new parts are being used. The pumps and pump system were completely dismantled and cleaned and are again in operation.

A demountable gun testing tube is nearing completion. This tube will be used for testing grids and cathodes.

Tests on the bifilar-helix output matching section have continued. Results indicate that with some modification of the structure, the match will be satisfactory.

Work on the services and on the exhaust station has progressed during the month; most of the components have been installed but have not yet been connected to the plumbing lines.

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On June 18, 1953, a paper based on the work reported in Progress Report No. 11 entitled "Some Experimental Results on a High-Power L-Band Traveling-Wave Tube," was presented at the Eleventh Annual Conference on Electron Tube Research.

During the next month effort will continue on the rebuilding of the X-244 L-band traveling-wave tube, on the demountable gun-test tube, on the bifilar helix matching, and on the exhaust station.

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